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ultraviolet rays radiated by a discharge from xenon Xe included in the discharge gas. Examples of such ultraviolet region light emissive material include $BaSi_2O_5:Pb^{2+}$ (a wavelength of emitted light: 350 nm), $SrB_4O_7F:Eu^{2+}$ (wavelength of emitted light: 360 nm), $(Ba, Mg, Zn)_3Si_2O_7:Pb^{2+}$ (wavelenth of emitted light: 295 nm), $YF_3:Gd, Pr$, and so on.

【0066】

The visible region light emissive material has the persistence characteristics allowing radiation of ultraviolet light for 0.1 msec or more, preferably, 1 msec or more, resulting from excitation by 147nm-wavelength vacuum ultraviolet rays radiated by the discharge from xenon Xe included in the discharge gas. Example of such visible region light emissive material includes a phosphor material such as red $(Y,Gd)BO_3:Eu$ and green $Zn_2SiO_4:Mn$.

【0067】

In the above-mentioned PDP, each row electrode pair (X, Y) forms a display'line (row) L on the matrix display screen.

【0068】

For forming images on the above PDP as on the conventional PDP, the reset discharge is first produced between the column electrodes D and the row electrodes X or Y in all the discharge cells to form the wall charge on the surface of the dielectric layer 11 in all the discharge cells C.

【0069】

Then, through the addressing operation, the opposite discharge is selectively operated between the row electrode pair (X, Y) and the column electrode D in each discharge cell, to scatter the lighted cells (the discharge cells C in which the wall charge on the dielectric layer 11 is not erased) and the non-lighted cells (the discharge cells C in which the wall charge on the dielectric layer 11 is erased) in all the display lines L throughout the panel in accordance with the image to

be displayed.

【0070】

After the addressing operation, simultaneously in all the display lines L, discharge sustain pulses are applied alternatively to the row electrode pairs (X, Y). The surface discharge is initiated between the transparent electrodes Xa and Ya opposing each other in each lighted cell in every application of the discharge sustain pulse.

【0071】

As described above, ultraviolet light is generated through the surface discharge in the lighted cell, and each R, G, B phosphor layer 16 in the discharge space S is excited to emit light, resulting in generating an image to be displayed.

【0072】

In the PDP, the discharge gas is filled into or removed from each discharge cell through the clearance r which is provided between the face of the vertical wall 18a of the partition wall 18 on the display surface side and the protective layer 12 overlaying the dielectric layer 11. Moreover, due to the clearance r, the priming effect of propagation of triggers of the discharge between the adjacent discharge cells C in the row direction is ensured.

【0073】

The additional dielectric layer 11A blocks communication between the adjacent discharge cells C in the column direction in order to prevent the discharge for generating an image from spreading into an adjacent discharge cell in the column direction to produce a false discharge. However, each discharge cell C communicates with the interstice SL, provided in the transverse wall 18, through the groove 11Aa provided in the additional dielectric layer 11A. For this reason, the priming particles (pilot flame) is introduced from the interstice SL into an adjacent discharge cell in the column

direction via the groove 11Aa, resulting in ensuring the priming effect in the column direction as in that in the row direction.

【0074】

Specifically, driving pulses (reset pulses RPx, RPy applied to the column electrode D and the row electrode X or Y in the reset operation in Fig. 21; scan pulses SP applied to one of the row electrodes X, Y in the addressing operation; and display data pulses DP_{1-n} applied to the column electrode D) are applied between the column electrode D and the row electrode X or Y for producing the reset discharge (a discharge for temporarily forming wall charge in all the discharge cells C) in the reset operation, and the selective discharge (a discharge for selectively erasing the wall charge formed by the reset discharge in response to the display image data) in the addressing operation. At this time, since the production of the discharge is facilitated because of the short discharge distance between the column electrode D and the row electrodes X, Y in the region where the additional dielectric layer 11A is provided, the discharge is produced between the column electrode D and the row electrodes X, Y in the interstice SL.

【0075】

The priming particles (pilot flame) is generated in the interstice SL by the discharge, and then spread through the groove 11Aa into an adjacent discharge cell C in the column direction. This produces the priming effect of inducing the discharge between the adjacent discharge cells C.

【0076】

The 147nm-wavelength vacuum ultraviolet rays radiated from xenon included in the discharge gas in the reset discharge, are guided through the groove 11Aa into the interstice SL, and then excite the priming particle generating layer 19 which is made of the ultraviolet region or the visible region light emissive material and provided in the interstice SL, to cause

the priming particle generating layer 19 to radiate ultraviolet light or visible light. In turn, the ultraviolet light or visible light excites the protective layer (MgO layer) 12 for emission of the priming particles.

【0077】

When the ultraviolet region or the visible region light emissive material forming the priming particle generating layer 19 contains a material having a work function smaller than that of dielectrics (MgO) (a high γ material), the 147nm-wavelength vacuum ultraviolet rays radiated from the xenon included in the discharge gas in the reset discharge are guided via the groove 11Aa into the interstice SL, and excite the priming particle generating layer 19 for radiation of ultraviolet light or visible light. The radiated ultraviolet light or visible light excites the protective layer (MgO layer) 12 and the high γ material contained in the priming particle generating layer 19 for emission of the priming particles.

【0078】

In this way, due to the persistence characteristics of the ultraviolet region light emissive material or the visible region light emissive material forming the priming particle generating layer 19 and situated in the interstice SL, ultraviolet light or visible light is continuously radiated for at least 0.1 msec or more. In consequence, the amount of priming particles in the addressing period Wc following the concurrent reset period Rc (see Fig. 21) is sufficiently ensured.

【0079】

The foregoing shows an example in which the groove making communication between the discharge space in the discharge cell C and the discharge space in the interstice SL is provided in the additional dielectric layer 11A, but the present invention is not limited to this. The groove may be provided in the transverse wall of the partition wall to communicate between

the discharge space in the discharge cell C and the discharge space in the interstice SL.

【0080】

Further, in the foregoing example, the black or dark brown light absorption layer 17A is provided in the area sandwiched by the bus electrodes Xb and Yb which serve as a non-display line, and the bus electrodes Xb and Yb include the respective black conductor layers Xb', Yb' on the display surface side. For this reason, the reflection of ambient light on the non-display lines is prevented to enhance contrast. In addition, when the discharge for the priming is produced between the column electrode D and the row electrode X, Y in the interstice SL, the resulting light may not adversely affect the contrast on images.

【0081】

Further, in the foregoing example, the transverse wall 18b of the partition wall 18 defining the discharge space S is divided in the column direction by the interstice SL provided between the display lines L, and a width of a divided transverse wall 18b' is set to be approximately equal to a width of each vertical wall 18a. This decreases variations resulting from the shrinkage when the partition wall 18 is burned. For this reason, the front glass substrate 10 and the back glass substrate 13 may not produce warpage, and the shape of the discharge cell may be not deformed by damage to the partition wall 18, or the like.

【0082】

Next, a second example in the embodiment according to the present invention will be described with reference to Fig. 7 to Fig. 12.

【0083】

Figs. 7 to 9 illustrate a partition wall structure in the PDP of the second example. Fig. 7 is a front view of a partition